NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FEED MANAGEMENT

(Animal Units (AUs) Affected)

CODE 592

DEFINITION

Manipulating and controlling the quantity and quality of available nutrients, feedstuffs, or additives fed to livestock and poultry.

PURPOSE

- Improve feeding efficiency in a manner that facilitates and contributes to the conservation of natural resources.
- Reduce the quantity of nitrogen, phosphorus and other nutrients excreted in the manure.
- Reduce the quantity and viability of pathogens in manure.
- Reduce odor, particulate matter, and greenhouse gas (GHG) emissions production from animal feeding operations.

CONDITIONS WHERE PRACTICE APPLIES

Livestock and poultry operations with a whole farm nutrient imbalance, with more nutrients imported to the farm than are exported and/or utilized by cropping programs.

- Livestock and poultry operations that have a significant accumulation of nutrients in the soil.
- Livestock and poultry operations that land apply manure and do not have a land base large enough to allow nutrients to be applied at rates recommended by soil test and utilized by crops in the rotation.
- Livestock and poultry operations seeking to improve nutrient use efficiencies.
- Livestock and poultry operations seeking to reduce manure pathogens.
- Livestock and poultry operations seeking to reduce odors and or GHGs from their manure.

CRITERIA

General Criteria Applicable to All Purposes

Sufficient nutrients will be supplied to maintain the health, growth, production, performance and reproduction of livestock and poultry.

The diets for specific species of animals will be developed in accordance with recommendations from one of the following:

- The most current recommendations of the National Research Council (NRC).
- Recommendations of Cornell University guidelines.

Laboratory analysis will be done on the feed ingredients used to formulate the diet, and on the formulated diet to determine the accuracy of feeding management to deliver the formulated diet. Feed analyses will be conducted as often as necessary to adjust the diets for changes in chemical composition of the feeds

being fed.

Feed analyses will be conducted by laboratories whose tests are accepted by Cornell University, the State Department of Agriculture, or another appropriate body, in the state in which the feeding strategy will be implemented. Data from analyzed feed ingredients and/or appropriate historic feed analysis information for the operation will be used for adjustments of ration formulation.

Manure analyses or calculated nutrient intake and excretion can be used to determine nutrient use and excretion. If manure analyses are used, the analyses must be conducted by laboratories whose tests are accepted by Cornell University, the State Department of Agriculture or another appropriate body in the state in which the feeding strategy will be implemented. Nutrient intake and excretion calculations from spreadsheets or computer models are also acceptable methods to monitor nutrient intake and excretion. The calculations used in these spreadsheets or computer models must be science based and developed from standards outlined in the most current recommendations of the National Research Council (NRC) or recommendations from Cornell university.

Diets and feed management strategies will be developed by professional animal scientists, independent professional nutritionists or other comparably qualified individuals. When required by state policy or regulation, animal nutritionists will be certified through a certification program recognized within the state.

Diets will be formulated to provide the quantities and correct relative ratios of available nutrients required by the animal species to meet the goals for which the plan is being developed.

Adjustments to nutrient levels will be provided to meet specific genetic potential, environmental demands, and/or requirements to insure health, well-being and productivity.

One or more of the following feed management practices and/or diet manipulation technologies will be used to reduce N, P, other excreted nutrients, pathogens, odors, and/or GHGs, while maintaining the health, well-being and productivity of the animal.

- Formulating diets closer to animal requirements, complemented by feed management that results in grouping animals according to requirements and consistent delivery of the formulated diets to the correct group of animals.
- Reducing protein in the diet by formulating diets to meet rumen nitrogen and animal amino acid requirements.
- Manipulating the crude protein and energy (carbohydrate and fat) content of the diet to enhance the availability of amino acids (ruminants). This may include shifts in carbohydrates, fats, and types/quantities of protein utilized.
- Using highly digestible feeds and forages, as appropriate, in the diet.
- Using phytase and reducing the supplemental phosphorus content of the diet (non-ruminants)
- Reducing the phosphorus content of the diet of ruminants when P is being overfed. It is recognized that P levels in some diets will exceed NRC recommendations because of high P levels in forages, grains, and food byproducts being fed.
- Using selected scientifically supported, enzymes or other products to enhance feed digestibility or feed use efficiency.
- Using scientifically supported and environmentally benign growth promotants and additives as allowed by law.
- Implementing phase feeding.
- Implementing split-sex feeding.
- Using other feed processing, management, or diet manipulation technologies that have demonstrated the ability to reduce manure nutrient content, pathogens, odors, or GHGs.

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- When livestock are obtaining their diet by grazing pastures a well as mechanically harvested and processed feeds, pasture forages will be tested for nutrient content and accounted for in the feed ration and balance of nutrients. All feeds, including grazed pasture will be included in an analysis for meeting the livestock's nutritional requirements and avoiding excess nutrients being fed. Forage tests will meet Cornell University's acceptance and certification process.
- Increasing the use of homegrown forages and grains in the diet as a method of reducing nutrient imports and improving the mass balance of nutrients on the farm. Increased levels of homegrown forages in the diet relative to grains or food processing by-products may improve mass balance.

CONSIDERATIONS

Feed management can improve net farm income by feeding nutrients more efficiently.

Consider nutrient requirements for production based upon stage of growth, intended purpose of the animal and the type of production (e.g., meat, milk, eggs) involved.

Use management practices described in the NRCS Nutrient Management (Feed Management) Technical Notes for the specific animal species[3].

Consider different feed ingredients (e.g. by- products) and their potential impacts on the nutrient content of excreted manure.

Analyze the drinking water consumed by the animals to determine its nutrient content, and/or sulfur content, and/or presence of pathogens, and adjust the diet or treat the water to account for these extra elements.

Consider the potential impact of feed management on the volume of manure excreted and on manure storage requirements.

Consider the impact of feed management practices and diet manipulation on manure odors, pathogens, GHGs, dust, animal health and well-being even if one or more of these are not included in the client's objectives.

Consider using concentrates and forages grown on the farm to minimize the quantity of nutrients imported to the farm, and to maximize the recycling of nutrients on the farm.

If manure is to be sampled and analyzed to assess manure nutrient content and to estimate the impact of the feeding strategy, fresh, fecal samples need to be collected.

PLANS AND SPECIFICATIONS

Plans and specifications for feed management will be in keeping with the requirements of this standard. They will describe the specific feed management practices and/or technologies that are planned for the operation.

The following components will be included in the feed management plan:

- The type of technology, or technologies, and/or feeding practices that will be used on the operation, and their intended outcome.
- Feed analyses and ration formulation information prior to and after implementation of feed management on the operation.
- Feed weighing, mixing and delivery to consistently deliver the formulated diet that matches the requirements of each group fed.
- Protocols for sampling and preserving feed ingredients, manure, and water, as applicable, prior to sending for analysis.

- The estimated, or measured, nutrient content of the manure prior to the implementation of feed management on the operation.
- The estimated impact that feed management will have on manure nutrient content and/or feed nutrient imports.
- The expected impact on pathogen content, odor, and GHG reduction of manure.
- Guidance for how often the feed management plan will be reviewed and potentially revised.
- The quantities and sources of nitrogen and phosphorus that will be fed.
- Identification of the qualified feed management specialist who developed the plan.

OPERATION AND MAINTENANCE

The producer/client is responsible for the operation and maintenance of the feed management plan. Operation and maintenance activities address the following:

- Periodic plan review to determine if adjustments or modifications are needed.
- Routine feed analysis to document the rates at which nitrogen and phosphorus were actually fed. When actual rates fed differ from or exceed the planned rates, records will indicate the reasons for the differences.
- Maintain records to document plan implementation. As applicable, records include:
  - ♦ Feed analysis and ration formulation, including the record of ration formulation used prior to implementing the feeding strategy.
  - ♦ Records' estimating the impact the feeding strategy is having on reducing manure nutrient content.
  - ♦ Manure analysis that was done after the feeding strategy was implemented to determine manure nutrient content.
  - ♦ Dates of review and person performing the review, and any recommendations that resulted from the review.

Records of plan implementation will be maintained for five years, or for a period longer than five years if required by other Federal, state, or local ordinances, program, or contract requirements.

REFERENCES

National Academy of Sciences Animal Nutrition Reports http://dels.nas.edu/Agriculture/Animal-Nutrition/Reports-Academies-Findings

USDA - NRCS and USDA-ERS. 2000. Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/dma/?&cid=nrcs143_014126

USDA - NRCS 2003 Nutrient Management Technical Note #1 – Effects of Diet and Feeding Management on Nutrient Content of Manure

USDA - NRCS 2003. Nutrient Management Technical Note # 4 – Feed and Animal Management for Poultry.

USDA - NRCS 2003. Nutrient Management Technical Note #2 – Feed and Animal Management for Beef Cattle.

USDA - NRCS 2003. Nutrient Management Technical Note #3 – Feed and Animal Management for Swine (Growing and Finishing)

USDA - NRCS 2003. Nutrient Management Technical Note #5 – Feed and Animal Management for Dairy Cattle

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